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August 11, 2006

Sent by electronic mail and United States mail

Mr. Pete Kmet
State of Washington Department of Ecology
Toxics Cleanup Program
Post Office Box 47600
Olympia, Washington 98504-7600

Re: Rayonier Properties, LLC comments on Ecology initial notice regarding proposed MTCA rulemaking

Dear Mr. Kmet:

Enclosed are comments submitted on behalf of Rayonier Properties, LLC with respect to the Department of Ecology's initial public notice regarding proposed rulemaking to amend MTCA cleanup regulation requirements for mixtures of dioxins/furans, PAHs and PCBs. Rayonier appreciates the opportunity to comment on this preproposal notice.

Thank you.

Sincerely,

SUMMIT LAW GROUP, PLLC

David M. Heineck

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Enclosure

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Rayonier Properties, LLC comments on Department of Ecology June 2006 Initial Notice regarding Proposed MTCA Rulemaking

I. Introduction

The State of Washington Department of Ecology (Ecology) published an initial public notice regarding proposed amendments to the Model Toxics Control Act (MTCA) Cleanup Regulation (WAC Chapter 173-340) in the June 12, 2006 *Washington State Register*. Ecology proposes to amend the MTCA cleanup level requirements for mixtures of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (dioxins/furans), polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). Ecology has issued a document in support of the proposed rulemaking entitled "*Background Document: Rulemaking Issues Related To Application Of The Toxicity Equivalency Factor (TEF) Methodology For Mixtures Of Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans (Dioxins/Furans), Polycyclic aromatic hydrocarbons (PAHs) and Polychlorinated biphenyls (PCBs),*" July 2006 (*Background Document*). Ecology provided a public comment period through August 11, 2006 for input regarding this initial notice. Rayonier Properties, LLC (Rayonier) appreciates the opportunity to comment regarding the preproposal notice.

Ecology characterizes the proposed rulemaking as a mere "clarification" of Ecology's MTCA policies and removal of an "ambiguity" in the MTCA regulations. This is inaccurate. The rulemaking would place more stringent cleanup requirements on mixtures of dioxin/furans, PAHs and PCBs than allowed under the current MTCA regulations. Ecology's initial notice does not make this fact clear. Ecology must communicate this fact to the public in plain terms to allow meaningful public comment.

In Rayonier's view the proposed new cleanup requirements have not been shown to be necessary, lack regulatory or scientific basis, make these particular mixtures a special case for more stringent cleanup without any stated justification, and would be costly and problematic to achieve given the background levels of some of these substances. Rayonier also objects to the proposed rulemaking to the extent that it would incorporate or otherwise give regulatory status to Ecology's MTCA Cleanup Levels and Risk Calculation (CLARC) guidance. That guidance is incomplete and in some respects inaccurate and has not itself been made subject to public notice and comment under rulemaking procedures.

The following lists Rayonier's primary objections to the proposed amendments as presented in the initial notice. These are not presented in any particular order of priority.

1. **Inappropriate use of Toxicity Equivalency Factors.** The proposed rule revisions and *Background Document* circulated by Ecology equate each of the dioxin and furan congeners to an index chemical (2,3,7,8-TCDD) using Toxicity Equivalency Factors (TEFs). Because these factors only account for variability in toxicity, using these factors to equate a mixture of chemicals to a single chemical prior to calculating exposure results in pervasive errors in the exposure estimation because the toxicity of each of the chemicals is not an estimate of, nor proportional to, other chemical properties that directly affect exposure (e.g., lipohilicity, vapor pressure, practical vapor partition, octanol water partition coefficient, photolysis rate, water solubility). Ecology's proposed changes to WAC 173-340-708(8) intended to address this issue are vague and unnecessary in light of exiting MTCA requirements.

2. **The CLARC guidance should not serve as the framework for applying the current MTCA cleanup regulation or the amendments that are the subject of this proposed rulemaking.** Ecology presents the CLARC guidance as the proper example of how MTCA regulatory requirements should be applied to the specific chemical compound groups that use a TEF methodology. This would lead to numerous errors and uncertainties. The CLARC tool and its supporting guidance contain inaccuracies, inconsistencies and undocumented methods. Reliance on CLARC to interpret or apply MTCA requirements is unjustified.

3. **The *Background Document* contains a disproportionate amount of discussion regarding the TEF approach that obscures the far more significant proposal made in this rulemaking: classification of mixtures of dioxin/furans, PAHs and PCBs as single hazardous substances that would be regulated differently and more stringently than other types of mixtures.** Ecology's *Background Document* and other materials regarding this proposed rule focus on the TEF methodology. The proper selection and use of TEFs are scientific questions that should be guided by the World Health Organization, the National Academy of Sciences and other recognized research entities, and Ecology can help ensure the use of good science by applying the TEF methodology that EPA has reviewed and incorporating the EPA TEF methodology that has been reviewed and recommended by the National Academy of Sciences. In contrast, the proposed classification of these mixtures as single hazardous substances is both a scientific and regulatory question for which public review and comment is essential. Ecology must more clearly inform the public regarding the fundamental change this rule

would make regarding the cleanup levels for these mixtures to allow meaningful public review and comment.

4. **Ecology has not identified why rulemaking is needed to classify mixtures of dioxins/furans, PAHs and PCBs as "single" hazardous substances and thus subject to a 1 x 10^{-6} cleanup level while other mixtures remain subject to the 1 x 10^{-5} cleanup level established under the current MTCA rule.** The only justification Ecology offers is its characterization of the Rayonier litigation as one that identified an "ambiguity" in the MTCA rule regarding cleanup requirements for mixtures of dioxins/furans, PAHs and PCBs. This is not correct since the Rayonier litigation was not directed at an ambiguity in the rule, but at Ecology's attempt to apply the CLARC guidance in direct conflict with the rule. The justification that the rule merely removes an ambiguity is both incorrect and fails to explain the true extent and impact of the proposed amendments. Also, while the TEF methodology uses the toxicity of a single index compound to assess the toxicity of mixtures of compounds in that class, it does not dictate or require the chemical fiction that all the compounds thereby constitute that single index compound. Ecology must justify this proposed more stringent regulation of these classes of mixtures based on human health or environmental protection.

5. **The proposed rule changes provide no practicable benefit with respect to risk reduction.** The actual effect of lowering the MTCA risk limits for some individual carcinogenic compounds but not others will result in significantly more cleanup effort, time and cost but will not reduce the risk posed by most of the sites where the rule changes are likely applicable. This is because the various individual carcinogenic compounds proposed for treatment as single compounds are usually found together at sites along with other carcinogenic compounds not addressed by these rule changes. Given that MTCA regulate total site risk from carcinogens at a 1 x 10^{-5} level, no net risk reduction is likely to result at most sites cleaned up under this proposed amendment.

6. **The proposed rule changes undermine the MTCA statutory and regulatory objective of basing cleanup decisions on good science.** The scientific methodologies these amendments would codify are evolving. Codifying specific science requirements as opposed to requiring appropriate currently acceptable science is bad regulation. Also, regulating some individual chemicals differently—as this proposed rule would do with respect to dioxins/furans, PAHs and PCBs—from others that pose the same potential risk is mere fiat and not scientifically justified. Doing so undermines the foundations of MTCA as a science-based law and lacks a scientific, regulatory or rational basis.

7. **Ecology's schedule for public review and comment and issuance of these proposed amendments in a final rule is inappropriately compressed. Thus rulemaking involves complex technical and scientific issues and could have a wide impact.** Ecology has felt it necessary to provide a 50-page *Background Document* to explain the proposed rule changes to the public. This reflects Ecology's recognition that the rulemaking involves numerous and complex issues. Ecology nevertheless has put this rulemaking on an expedited schedule. Ecology has not explained why these amendments are needed so urgently. Given these factors, this rulemaking must be put on a normal schedule to allow the public review and comment—and Ecology deliberation—that are needed on this complex proposal.

II. Ecology summary of the Rayonier litigation that preceded this rulemaking

Ecology states in its June 12, 2006 initial notice and its July 2006 *Background Document* that it commenced this rulemaking based on the outcome of litigation that Rayonier filed in November 2005 (*Rayonier Properties, LLC v. Department of Ecology,* No. 05-2-02286-5, Thurston Cty. Sup. Ct.). The action was resolved through a Stipulation of Settlement (the Stipulation) entered on April 27, 2006. Since the Rayonier litigation apparently has caused Ecology to initiate this rulemaking, it is important for the record to correct some of Ecology's summary of that action.

First, the *Background Document* at page 7 is incorrect in stating that the Rayonier litigation was based on an "ambiguity in the MTCA rule" with respect to cleanup level requirements for dioxin/furan mixtures. Just the opposite. Rayonier asserted that the MTCA regulations were clear and *unambiguous* that mixtures of dioxins/furans, like other mixtures, consisted of multiple hazardous substances. The Rayonier action was based on a direct conflict between the MTCA rule that classified these groups of compounds as "mixtures" and Ecology's attempt to apply inconsistent and unpromulgated CLARC guidance that classified them as a single hazardous substance. Rayonier agreed in the litigation, and agrees now, that the Toxicity Equivalent Factor (TEF) methodology allows the toxicities of the various dioxin/furan congeners to be expressed relative to the toxicity of one of them, specifically 2,3,7,8-TCDD. But Rayonier pointed out that only the CLARC guidance, and not the MTCA rule, takes the leap of stating that this somehow means that all the congeners in the mixture are a single substance, i.e., 2,3,7,8-TCDD, and not a mixture at all.

Rayonier filed its action because of the practical effect of displacing the MTCA rule with the CLARC guidance. The MTCA rule establishes cleanup levels for individual hazardous substances at the 1×10^{-6} excess cancer risk level, while allowing mixtures to be controlled to a 1×10^{-5} risk level. *See* WAC 173-340-705(2)(c)(ii) and 173-340-708(5)(d). The CLARC guidance—and this proposed

rulemaking—would single out mixtures of dioxin/furans, PAHs and PCBs for classification as a single hazardous substance subject as a group to a 1×10^{-6} cleanup level. Ecology agreed in the Stipulation that the CLARC approach was not mandated by the MTCA rule and Rayonier was not obligated to apply it. The summary of the Rayonier litigation at page 12 of the *Background Document* remarkably does not mention the conflict between the MTCA rule and the CLARC guidance that was at the center of the dispute and makes no mention of the key issue that the Stipulation resolved, i.e., that the MTCA rule classifies mixtures of dioxins/furans like any other mixture and thus subject to the maximum 1×10^{-5} cleanup level.

The Rayonier litigation was based on the CLARC guidance-MTCA rule conflict and not any "ambiguity" in the rule. By the same token, this proposed rulemaking does not resolve an "ambiguity," but would establish new and significantly more stringent requirements for these particular types of mixtures. Ecology must clearly inform the public that these amendments are not just a regulatory clarification but would mandate new requirements. Meaningful public review and comment demand this.

Second, Ecology's Preproposal Statement of Inquiry is incorrect in stating that the Rayonier litigation "identified an ambiguity in the state's. . . use of the TEF methodology." As discussed above, Rayonier did not challenge Ecology's adoption of the TEF methodology. Rayonier also did not identify any "ambiguity" in Ecology's use of that methodology. Rayonier challenged only the fact that the CLARC took a leap that the MTCA rule did not take that the TEF methodology somehow justified classifying all the compounds present in dioxin/mixtures as a single hazardous substance.

Third, and also related to the adequacy of the information Ecology has provided to the public relating to the Rayonier litigation and this proposed rule, the *Background Document* at page 11 is inaccurate in stating that the "CLARC guidance document mirrors the MTCA rule. . . ." (Emphasis added.) Ecology itself agreed in the Stipulation settling the Rayonier action that the MTCA rule did not contain the mandate set forth in the CLARC guidance that dioxin/furan mixtures must be classified as a single hazardous substances. Thus it is inaccurate to state that the CLARC guidance "mirrors" the MTCA rule. While this may seem a minor point, this mischaracterization is significant in the context of this rulemaking. The *Background Document* makes it appear that the proposed rulemaking merely fixes an ambiguity in the MTCA rule so that it can be applied with the CLARC guidance, with which it is otherwise consistent, as one piece. The Rayonier litigation established that the two were in conflict with respect to cleanup requirements for dioxin/furan (and by extension PAH and PCB) mixtures. Again, Ecology must inform the public that this proposed rulemaking would impose new requirements, specifically those in the CLARC guidance that are inconsistent with the current MTCA rule and that would gain regulatory status under this rulemaking.

III. Ecology has not shown that this proposed rulemaking is needed or what it would accomplish

As Ecology recognizes in its *Background Document*, one of its rulemaking requirements is to explain why the proposed rule is needed. The only justification that Ecology seems to offer is that the rulemaking is needed to remove an "ambiguity" that the Rayonier litigation "exposed" in the MTCA rule. This supposed rationale is spurious. As discussed above, the Rayonier litigation was not based on an ambiguity in the MTCA rule. Instead it was based on a direct conflict between the way Ecology wanted to apply it, as stated in the CLARC guidance, and the way the rule actually read.

Ecology therefore must provide some other rationale for this proposed rulemaking, some other reason why this rule is needed. Ecology must justify why mixtures of dioxins/furans, PAHs and PCBs should be subject to different and more stringent requirements—specifically, a cleanup level requirement of 1×10^{-6}—than mixtures of other hazardous substances that remain subject to the general MTCA cleanup level of 1×10^{-5}. It is not enough for Ecology to state, as it does at page 7 of the *Background Document*, that this rulemaking merely "clarif[ies] key policy decisions." Rulemaking always embodies agency policies. This does not obviate the need for Ecology to articulate why the proposed rule is needed. Since its proffered reason of "clarifying an ambiguity" is without substance, Ecology has not yet met this rulemaking requirement. Ecology must provide a human health or environmental justification for its proposed differential regulation of these particular types of mixtures.

Not only has Ecology not provided a justification for this proposed rule grounded in human health or environmental protection, the Stipulation between Ecology and Rayonier by implication supports the opposite conclusion that the current MTCA rule is adequately protective with respect to cleanup level requirements for these mixtures. Ecology agreed in the Stipulation that classifying dioxin/furan mixtures as such, evaluating the toxicity of their components using the TEF methodology, and holding them to the 1×10^{-5} cleanup level applicable to all mixtures is "acceptable. . . to assess the potential carcinogenic risks of, and establish 'Method B' cleanup levels for, mixtures of dioxins and furans." Stipulation at ¶ 2. Rayonier submits that Ecology would not make this determination without concluding that the cleanup requirements applicable to these mixtures under the current MTCA rule are adequately protective of human health and the environment. Ecology therefore must articulate what new information it has obtained demonstrating why that conclusion is not longer true.

The *Background Document* contains considerable discussion regarding the TEF methodology. Rayonier in its litigation did not challenge Ecology's adoption of this methodology, although as discussed later in these comments the company has

significant concerns and objections regarding how Ecology proposes to apply it. But to some extent Ecology's extended discussion of the TEF methodology obscures the real effect of the proposed rule. This rulemaking would not incorporate the TEF methodology in the MTCA rule, since it has been part of the rule since 2001. Instead it would single out mixtures of dioxin/furans, PAHs and PCBs for more stringent cleanup than other mixtures. As discussed above, Ecology has not yet provided a justification for this more stringent regulation. The TEF methodology also does not provide a justification for classifying these mixtures as a single hazardous substance. The fact that the TEF methodology expresses the toxicities of the compounds in these mixtures relative to the toxicity of just one of them, for example 2,3,7,8-TCDD for dioxins/furans and BaP for PAHs, does not justify classifying all those compounds as being that benchmark one. The TEF methodology does not prescribe that result. Nor does science support this kind of chemical fiction.

Ecology's justification for regulating these particular mixtures differently and more stringently than other mixtures must be justified on human health or environmental grounds that the state has not yet provided. Failure to provide that justification would invalidate this rule procedurally as not meeting APA and other requirements and also would invalidate it substantively as constituting arbitrary agency action.

IV. Ecology has not presented an evaluation of the practical impacts of this proposed rule, particularly with respect to dioxin/furan cleanup requirements

The 1×10^{-6} cleanup level for mixtures of dioxins/furans established by this rule would be an order of magnitude more stringent than the current MTCA rule requirement. It also would mandate cleanup levels for individual dioxin congeners to levels in the 10^{-7} range or lower, of course, since the combined mixture would be subject to the 1×10^{-6} maximum. As Rayonier would present in greater detail in commenting on any proposed rule if Ecology proceeds with this unnecessary and unjustified rulemaking, dioxins/furans are widespread in the environment since they are released from hydrocarbon and wood combustion and other common sources. These sources have created background levels of dioxin/furan congeners in the same range as the levels that would need to be remediated under this proposed rule. Ecology has not presented any justification for requiring cleanup of dioxin/furan congeners that are at or near background concentrations, or any evaluation of the practical impact including additional costs this would impose on the regulated community—a group composed not only of companies like Rayonier, but also municipalities, port districts and other governmental entities that are site owners/operators and that would need to fund the substantially more costly investigative and cleanup actions at taxpayer expense. Requiring cleanup of these classes of mixtures to levels at or near background would be unreasonable and

arbitrary and has not been justified in the background documents Ecology has issued to date.

V. Even if similar regulatory programs established by other state and federal agencies were sufficient justification for this proposed rule, few if any of the other programs cited by Ecology demonstrate comparable regulation

As discussed above, Ecology has not yet presented any justification for this proposed rule or analysis of what it would accomplish other than the unsupportable claim that this merely clarifies a MTCA rule ambiguity. The justification and analysis must be grounded in a determination that this rule would provide a meaningful increment of additional human health or environmental protection, and that there are grounds for placing different and more stringent requirements on these particular classes of mixture—a result that the TEF methodology itself does not compel or support.

Ecology must develop this justification under the MTCA framework even if there were ample precedent under other state and federal programs for classifying dioxin/furan, PAH and PCB mixtures as single hazardous substances and disregarding the scientific fact that they are composed of chemically and biochemcially distinct substances. However, Ecology has not demonstrated such precedent despite its attempt to do in the *Background Document.*

Pages 21-23 of Ecology's *Background Document* list other regulatory programs within and outside the State of Washington that Ecology represents as supporting its classification of these mixtures as single hazardous substances. However, these comparisons do not withstand analysis and do not provide the precedent that Ecology claims. For example, the listing of "Other Ecology Programs" on pages 21 and 22 merely lists other Ecology-administered programs that apply versions of the TEF methodology. However, as discussed above, that methodology only provides for toxicity indexing of mixtures against a single relatively well-studied compound and does not prescribe that the mixture must then be classified as that single compound. Further, this list does not demonstrate precedent for regulating mixtures under any of the cited programs to the 1×10^{-6} cleanup level. The single program that Ecology lists as applying this level at all is the Air Quality Program with respect to new sources of dioxins/furans, but that program applies it only as a screening level and not a regulatory cleanup or control level as Ecology proposes to do here. Similarly, Ecology's references at page 22 of the *Background Document* to programs administered by EPA and other federal and international agencies only provides examples where the TEF methodology is applied but does not provide a single example where these programs classify these mixtures as a single hazardous substance.

The same is true with respect to the programs administered by the other states listed at pages 22 and 23 of the *Development Document*. Ecology might contend that the MTCA-type programs administered by the listed states are nevertheless relevant because, even if they do not classify mixtures as a single hazardous substance, two of the states—Florida and Wisconsin—require dioxin/furan mixtures as a group to meet a 1×10^{-6} cleanup level and so functionally support Ecology's proposed rule. However, Ecology cites only to guidance applied by these states that establishes that cleanup standard and not to state regulations that, like the proposed rule here, make that standard a legal requirement. Even if these states had such regulations Ecology would need to provide a much more complete description of those programs to show that were comparable to the MTCA regulatory structure and this proposed rule. Even then the existence of such programs would not substitute for the MTCA-based human health and environmental justification that Ecology has yet to provide here.

VI. Technical objections to the proposed rulemaking

Rayonier also has significant technical objections to the proposed rule as presented in Ecology's preproposal notice and the *Background Document*. The following provides Rayonier's review to date regarding these technical issues. Rayonier may expand on these points if Ecology proceeds with issuing these new cleanup level requirements as a proposed rule.

1. Ecology's *Background Document*

Ecology's stated purpose in preparing the *Background Document* was to assist public review and discussion of the MTCA rule revisions being considered by the Toxics Cleanup Program (TCP) and achieve two main purposes:

- Describe the revisions that Ecology plans to make to the MTCA Cleanup Regulation.
- Describe the key rulemaking issues that Ecology considered when preparing the draft rule revisions, options for resolving those issues and Ecology's rationale for choosing particular options when preparing the draft rule revisions.[1]

Due to the compressed timeframe set by Ecology for comments on the preproposal notice, Rayonier is not able to respond with a thorough technical analysis of all the issues the *Background Document* raises. Rayonier likely will expand on these technical comments if Ecology proceeds to proposed rulemaking and there is a second public notice and comment period regarding this proposed rule.

[1] *Background Document* at 7.

a. Ecology's "Background Information" issues presented in the *Background Document*

To meet its stated objective to "assist public review and discussion of the MTCA rule revisions" and to frame the issues relevant to the proposed rule changes, Ecology presents some background information on four topics.

What Ecology has omitted is a sufficiently complete discussion of these issues upon which the reader can independently judge the relevance and impact of the proposed rule revisions.[2] Specifically, Ecology does not anywhere provide a statement of how these issues were raised or are relevant to the litigation that has supposedly precipitated the need for the rulemaking action.

i. Toxicity Equivalency Factors

The overwhelming majority of Ecology's *Background Document* focuses on a discussion of the selection and appropriate application of Toxicity Equivalency Factors (TEFs). Within the background information section, Ecology again provides a brief discussion of TEFs and how they may be used in the evaluation of various chemically-related compounds. Ecology extensively references this discussion to support the validity of using TEFs. In particular, Ecology quotes the National Academy of Sciences' review of EPA's dioxin reassessment report as noting "the toxic equivalency factor methodology provides a reasonable, scientifically justifiable, and widely accepted method to assess the relative potency of DLCs ..." (NAS, 2006, p. 6)[1]", (footnote in the original).[3]

Rayonier agrees with the NAS position on the use of TEF methodologies for various compounds. However, perhaps because of its brevity, Ecology's discussion of TEFs presents a somewhat inaccurate and incomplete picture of how TEFs are properly used.

Ecology's description of TEF use

Ecology views the TEF methodology as "a tool to evaluate the toxicity and assess the risks of complex environmental mixtures that have similar structure-activity relationships and have a common mode of action."[4] This is incorrect.

The TEF methodology is a tool that merely *assigns* a relative toxicity value to an individual chemical compound within a larger group of compounds "that *may* have similar structure-activity relationships and have a common mode of action." If, as

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[2] Ecology notes that its Background Information section is but a brief summary of the issues.
[3] Health Risks from Dioxin and Related Compounds: Evaluation of the EPA Reassessment. Committee on EPA's Exposure and Human Health Reassessment of TCDD and Related Compounds. National Academy Press, Washington DC. July 2006 (Hereinafter *NAS Dioxin Review*)
[4] *Background Document* at 10.

Ecology is proposing, dioxin-like PCBs are grouped with dioxins and furans using 2,3,7,8 – TCDD based TEF values, then there would be a mix of similar structure-activity relationships present in the methodology.[5]

More important than the simplification of the individual compounds as a single group is Ecology's statement that TEFs are used to "evaluate the toxicity and assess the risks of complex environmental mixtures."

Once an individual compound is assigned a relative toxicity value through the application of that compound's specific TEF, the risk associated with that compound, whether contained in a "complex environmental mixture" or present by it self on site, is estimated using risk assessment procedures and parameters that are compound-specific and independent of the toxicity value assigned.

These compound-specific risk assessment procedures and parameters address such things as the individual compound's ability to migrate through environmental media or to accumulate differentially in member species of the food chain upon which a receptor is feeding.

Making the TCDD TEQ conversion of congener form prior to completing the required risk assessment calculations is scientifically inappropriate. The risk posed by concentrations of individual congeners will depend directly and significantly on their specific physical-chemical values. These values are functions of each compound's molecular structure and not its toxicity. The risk assessment process must consider these compound-specific values independently.

Take for example MTCA Method's B and C requirement to establish cleanup level "[c]oncentrations that eliminate or minimize the potential for food chain contamination as necessary to protect human health."[6] A credible risk assessment with a freshwater or marine component must evaluate the potential risks posed by the ingestion of fish and shellfish. The risk assessment effort to do so would be conducted under the MTCA rules relating to modified Methods B and C.[7]

The MTCA rules provide in Equation 730-2 a means of calculating a risk-based surface-water cleanup level based on fish ingestion. The formula in MTCA employs a Bioconcentration Factor (BCF) to estimate fish tissue concentrations of a compound in the water column. Unfortunately, this approach is particularly unsuited to assessing dioxin and furan-related risks for two reasons.

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[5] Id. at 49. The aromatic rings of PCDFs and PCDDs are joined by one or two oxygen atoms whereas the rings of PCBs are bonded directly together. The degree of structural difference may be argued by chemists but here mode of toxicity is the important issue.

[6] WAC 173-340-705(2)(c)(iii) and WAC 173-340-706(2)(c)(iii).

[7] WAC 173-340-705(4), WAC 173-340-706(4), and WAC 173-340-708 generally.

First, "[b]ecause of their high lipophilicity and low water solubility, CDD/CDFs are primarily associated with particulate and organic matter in soil, sediment, and the water column."[8] Use of a BCF for water concentration values below detection limits would result in high levels of uncertainty in the risk estimates.

Second, it is preferable to anchor the risk estimates in calculations based on detectable concentrations in other media. If present, the differentially higher sediment concentrations of dioxins would more likely be detected than those concentrations in the water body's dissolved phase. For these reasons, other well-established risk assessment techniques are more appropriate than the BCF approach.

Where estimating background seafood-related risk is necessary in the absence of representative tissue and water data, standard risk assessment procedures would employ various calculations to derive the risk estimate. The simple hypothetical dioxin and furan example below employs three calculations: 1) to estimate from its presence in sediments, a concentration of a compound in fish tissue, 2) to estimate the lifetime average daily dose an individual would receive and 3) to estimate the risk associated with consuming a given dose of the compound from the contaminated fish.

As this example is not intended to represent any particular conditions found at a site, representative and default values are used in the calculations.[9] Apply the following parameters to their respective equations:

Equation 1. Fish Tissue Concentration from Biota-to-Sediment Accumulation Factor

$$C_{fish} = \frac{\left(C_{sed} \times f_{lipid} \times BSAF\right)}{OC_{sed}}$$

Where:

Cfish = Concentration of compound in fish (mg/kg)	Calculated
Csed = Concentration of compound in sediments (mg/kg)	.000001 (1 ppt)[10]
flipid = Fish lipid content (unitless)	.034[11]
BSAF = Biota-to-sediment accumulation factor (unitless)	(see values

[8] *EPA Dioxin Reassessment – NAS 2003* at 2-15. (*See* note __ for complete citations of the EPA's Dioxin Reassessment)

[9] Equation parameter values are from MTCA, CLARC, EPA and others. Values are footnoted individually as to source.

[10] *EPA Dioxin Reassessment – NAS 2003* at 3-46. "A 'typical' background concentration is sediment is assumed to be 5.3 ppt TEQ_{DF}-WHO_{98}." To avoid any suggestion that the NAS 2003 value might also represent some local Washington value a 1 ppt amount is used only for the sake of calculation.

[11] O'Neill SM, West JE, and Hoeman JC. *Spatial Trends in the Concentration of Polychlorinated Biphenyls (PCBs) in Chinook (Oncorhynchus tshawytscha) and Coho Salmon (O. kisutch) in Puget Sound and Factors Affecting PCB Accumulation: Results from the Puget Sound Ambient Monitoring Program.* Washington State Department of Fish and Wildlife. In Puget Sound Research '98 at 324. The 3.4 percent value is the mean for chinook salmon.

below)[12]
OCsed = Fraction of organic carbon in bottom sediments (unitless) .045[13]

Equation 2. Lifetime Average Daily Dose from Consuming Contaminated Fish

$$LADD_{fish\ ingestion} = \frac{(C_{fish} \times CR \times DF \times ED \times EF)}{(ABW \times AT)}$$

Where:

$LADD$ = Lifetime average daily dose (mg/kg-day)	Calculated
C_{fish} = Concentration of compound in fish (mg/kg)	Calculated
CR = Consumption rate of contaminated fish (mg/kg)	54[14]
DF = Fraction of diet comprised of contaminated fish (unitless)	0.5[15]
ED = Exposure duration (30 years)[16]	
EF = Exposure frequency (1.0) (unitless)[17]	
ABW = Average body weight over the exposure duration (70 kg)[18]	
AT = Averaging time (75 years)[19]	

Equation 3. Lifetime Increased Incidence of Cancer Risk from Consuming Contaminated Fish

$$RISK_{fish\ ingestion} = LADD \times CSF$$

Where:

$RISK$ = Acceptable cancer risk level (unitless)	Calculated
$LADD$ = Lifetime average daily dose (mg/kg-day)	Calculated
CSF = Cancer slope factor $(mg/kg\text{-}day)^{-1}$	(*see* values below)[20]

The following tables demonstrate the problem of converting compounds to their TEF adjusted 2,3,7,8,-TCDD concentrations prior to assessing fully the risk posed by each individual compound. Only two individual compounds are evaluated to keep the comparison focused. The choice of compounds below is based on the TEF index compound for dioxins and furans (TCDD) and EPA's research as to the most common individual compound of the group found in environmental samples

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[12] *EPA Dioxin Reassessment – NAS 2003* at 2-107, Table 2-10.
[13] *RECOMMENDED METHODS FOR MEASURING TOC IN SEDIMENTS.* Prepared by Kathryn Bragdon-Cook (Department of Ecology) for the PSDDAagencies. http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/dmmo/toc_93.pdf [last accessed 5 August 2006] "PSDDA Reports, Development of Sediment Quality Values for Puget Sound, lists the 50%, 75%, and 90% TOC percentile concentrations for Puget Sound at 1.31%, 2.30%, and 4.50% respectively."
[14] WAC 173-340-730, Equation 730-2.
[15] Id.
[16] Id.
[17] Id.
[18] Id.
[19] Id.
[20] WHO 98 Values.

(OCDD).[21] Each table shows the results obtained using Equations 1 through 3 and varying inputs. Using Equation 1, we find:

Table 1: Equation 1 Results

	Ecology TEF Approach OCDD	EPA TEF Approach OCDD
Cfish (mg/kg)	4.46E-12	5.59E-10
Csed (mg/kg)	1.00E-10	1.00E-06
flipid (unitless)	0.0340	0.0340
BSAF (unitless)	0.0590	0.0007
OCsed (unitless)	0.0450	0.0450

Beginning with equal concentrations of 1 ppt in sediments, the fish tissue concentration of TCDD and OCDD will vary in direct portion to how the TEF is applied. In this instance the TEF used in the calculations is the WHO_{98} value of 0.0001 for OCDD as proposed by Ecology. As stated previously, Rayonier does not take issue with the use of TEF methods *to assign toxicity values*. It is Ecology's application of the TEFs to concentrations that leads to erroneous results and to which Rayonier objects.

Ecology would treat a one-part-per-trillion sediment concentration (1E-06 mg/kg) of OCDD as a 1E-10 mg/kg concentration TCDD TEQ. This is because Ecology multiplies the 1E-06 mg/kg OCDD sediment concentration by the OCDD TEF of 0.0001 (1E-04) in order to derive a TCDD TEQ based concentration. The columns labeled "Ecology" and "EPA" show the effect of applying the TEF to the individual compounds before conducting the necessary risk assessment procedures (Ecology) or afterwards (EPA). Table 1 reveals a greater than 100-fold difference in estimated fish tissue concentrations of OCDD. Ecology's tissue concentration estimates are substantially lower than EPA's.

Given the results of Equation 1 and all other exposure factors being the same, it is clear that an average lifetime daily dose is going to be directly proportional to the fish tissue concentration. Table 2 shows this result.

Here the LADD in the EPA TEF approach is adjusted by the application of the 0.0001 factor applied.

[21] *EPA Dioxin Reassessment – NAS 2003* at 3-46. "The congener that accounts for the highest proportion of total CDD/CDFs is OCDD, with 1,2,3,4,6,7,8-HpCDD and OCDF also accounting for significant portions of total CDD/CDFs (Table 3-20).".

Table 2: Equation 2 Results

	Ecology TEF Approach OCDD	EPA TEF Approach OCDD
LADD (mg/kg-day)	6.88E-13	8.63E-15
Cfish (mg/kg)	4.46E-12	5.59E-10
CR (mg/kg)	54.00	54.00
DF (unitless)	0.50	0.50
ED (years)	30.00	30.00
EF (unitless)	1.00	1.00
ABW (70 kg)	70.00	70.00
AT (75 years)	75.00	75.00

Having established a dose for each of individual compounds, all that remains to estimate a risk is the application of the compounds' toxicity values to the dose. Table 3 shows these results.

Table 3: Equation 3 Results

	Ecology TEF Approach OCDD	EPA TEF Approach OCDD
RISK (unitless)	1.03E-07	1.29E-09
LADD (mg/kg-day)	6.88E-13	8.63E-15

What originally appeared to be roughly a 100-fold lower exposure using Ecology's TEF application procedure actually becomes about a 100-fold over-estimation of the risk experienced by an individual consuming these contaminated fish.

Evident in the example above is the fundamental flaw in Ecology's approach to "assess the risks of complex environmental mixtures" by combining individual compounds into single TEF derived surrogate concentrations. Conflating, by the use of TEFs, the concentrations of various compounds for purposes other than the assigning compound-specific toxicity values to individual compounds or characterizing the total mass of individual compounds in a chemical group based on *toxicity* equivalence to a single compound generates an unrealistic result that lacks scientific defensibility in the context of risk assessment.

Ecology's WAC 173-340 TEF references

Ecology's background information section raises (without any discussion of their relevance) the options provided in the February 2001 MTCA amendments for

using a TEF methodology in risk assessments.[22] Two options are available for dioxins/furans and for PAHs carcinogenic toxicity characterization.

The first option merely treats all individual compound members of a particular group as equally toxic. The potency slope factor for one of the more toxic compound in the group is used for all the group's compounds. Although there is no scientifically-justifiable rationale for this approach it does serve as a conservative means of assigning a toxicity value to a number of similar compounds often found together at sites.

The second option for assigning toxicity to members of specific compound groups is the use of established TEF (or PEF for PAHs) methods. The MTCA rule cites two TEF methods, one for dioxins/furans and the other for PAHs. These methods are described in WAC 173-340-708 as:

> *"(d) When assessing the potential carcinogenic risk of mixtures of chlorinated dibenzo-p-dioxins (CDD) and chlorinated dibenzofurans (CDF) either of the following methods shall be used unless the department determines that there is clear and convincing scientific data which demonstrates that the use of these methods is inappropriate:*
>
> > *(i) The entire mixture is assumed to be as toxic as 2, 3, 7, 8 CDD or 2, 3, 7, 8 CDF, as applicable; or*
> >
> > *(ii) The toxicity equivalency factors and methodology described in: EPA. 1989.* ***"Interim procedures for estimating risks associated with exposure to mixtures of chlorinated dibenzo-p-dioxins and dibenzofurans (CDDs and CDFs) and 1989 update"****, USEPA, Risk Assessment Forum, Washington, D.C., publication number EPA/625/3-89/016.*
>
> *(e) When assessing the potential carcinogenic risk of mixtures of polycyclic aromatic hydrocarbons, either of the following methods shall be used unless the department determines that there is clear and convincing scientific data which demonstrates that the use of these methods is inappropriate:*
>
> > *(i) The entire mixture is assumed to be as toxic as benzo(a)pyrene; or*

[22] Ecology cites WAC 173-340-708(8)(d) for both dioxins/furans and PAHs. The relevant TEF option wording is found for dioxin/furans at WAC 173-340-708(8)(d)(ii) and for PAHs at WAC 173-340-708(8)(e)(ii).

*(ii) The toxicity equivalency factors and methodology described in "**CalEPA. 1994. Benzo(a)pyrene as a toxic air contaminant. Part B: Health Assessment.**" Published by the Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Berkeley, CA. When using this methodology, at a minimum, the following compounds shall be analyzed for and included in the calculations: Benzo[a]pyrene, Benz[a]anthracene, Benzo[b]-fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenz[a,h]anthracene, Indeno[1,2,3cd]pyrene. The department may require additional compounds from the CalEPA list to be included in the methodology should site testing data or information from other comparable sites or waste types indicate the additional compounds are potentially present at the site."*

Ecology contends that the two TEF/RPF methods referenced are synonymous with its CLARC guidance approach (*see* next section). Obviously, this should be easily confirmed through an objective comparison. This comparison of the two TEF/RPF methods and the CLARC guidance begins below with a discussion of the EPA and Cal-EPA citations. The CLARC guidance is then reviewed in its own section.

EPA's TEF methodology for dioxins and dioxin-like compounds

EPA's position on TEFs and their use in risk assessment may be found in various documents. The most complete and relevant discussion of the subject as it relates to Ecology rulemaking is in chapter 9 of EPA's "Dioxin Reassessment."[23] EPA states:

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[23] The U.S. EPA has since 1992 circulated a number of drafts of its health assessment document for dioxins. As Ecology notes, the National Academy of Sciences recently reviewed another draft the EPA's document. For the sake of completeness, the following citations are provided in order to identify the various drafts.

Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds: Part 1. Estimating Exposure to Dioxin-Like Compounds (U.S. EPA, 2000b) (which expanded upon a 1988 draft exposure report titled, Estimating Exposure to 2,3,7,8-TCDD [U.S. EPA, 1988d]); Part 2. Health Assessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds (U.S. EPA, 1994a; U.S. EPA, 2000c); and Part 3. Dioxin: Integrated Summary and Risk Characterization for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds (U.S. EPA, 2000d). Office of Health and Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC. EPA/600/P-00/001Cb. NAS Review Draft. December 2003. (Hereinafter as *EPA Dioxin Reassessment – NAS 2003*)

Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds: Part 1. Estimating Exposure to Dioxin-Like Compounds (U.S. EPA, 2000b) (which expanded upon a 1988 draft exposure report titled, Estimating Exposure to 2,3,7,8-TCDD [U.S. EPA, 1988d]); Part 2. Health Assessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds (U.S. EPA, 1994a; U.S. EPA, 2000c); and Part 3. Dioxin: Integrated Summary and Risk Characterization for 2,3,7,8-

"The TEF methodology provides a mechanism to estimate potential health or ecological effects of exposure to a complex mixture of dioxin-like compounds. However, the TEF method must be used with an understanding of its limitations. This methodology estimates the dioxin-like effects of a mixture by assuming dose-additivity and describes the mixture in terms of an equivalent mass of 2,3,7,8-TCDD. ***Although the mixture may have the toxicological potential of 2,3,7,8-TCDD it should not be assumed for exposure purposes to have the same environmental fate as 2,3,7,8-TCDD. The environmental fate of the mixture is still the product of the environmental fate of each of its constituent congeners. Different congeners have different physical properties such as vapor pressure, practical vapor partition, water octanol coefficient, photolysis rate, binding affinity to organic mater, water solubility, etc. Consequently, both the absolute concentration of a mixture in an environmental medium and the relative concentration of congeners making up an emission will change as the release moves through the environment.*** *For some situations, treating emission as equivalent to exposure, which assumes that modeling fate and exposure can be reasonably accomplished by treating a mixture as if it were all 2,3,7,8,-TCDD, is a useful but uncertain assumption.* ***However, for many risk assessments the differences in fate and***

Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds (U.S. EPA, 2000d). Office of Health and Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC. EPA/600/P-00/001Bb. September 2000. (Hereinafter as *EPA Dioxin Reassessment - 2000*)

Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and Related Compounds, Vols. I-III. External Review Draft. EPA/600/BP-92/001a,b,c. Office of Health and Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC. August 1994. (Hereinafter as *EPA Dioxin Reassessment - 1994*)

Note: EPA has marked most of its draft as "DRAFT—DO NOT CITE OR QUOTE". However, the EPA also directs public to the document through its web sites with the disclaimer:
THIS DOCUMENT IS A DRAFT FOR REVIEW PURPOSES ONLY AND DOES NOT CONSTITUTE U.S. ENVIRONMENTAL PROTECTION AGENCY POLICY. It has been provided for review to the National Academy of Sciences (NAS). While the NAS review is being conducted and until a final agency assessment has been released, the draft dioxin reassessment (NAS Review Draft or other draft versions) remains draft, does not represent a final position, and is not intended to serve as the basis or rationale for regulatory and other policy action. However, EPA will continue its work to reduce human exposure to dioxin. While the NAS review is underway and no final reassessment has been issued, in meeting their regulatory responsibilities, the agency will continue its current practice of utilizing the best available data that meet the EPA Information Quality Guidelines and the government-wide Information Quality Guidelines issued by OMB. The Agency will consider all such data and associated uncertainty to determine the strength of the evidence in proposing regulatory actions related to dioxin and dioxin-like compounds.

With respect to the section on TEFs, EPA states:
"As part of U.S. EPA's "Dioxin Reassessment," an external review draft has been released that includes a discussion of PCB TEFs -- Chapter 9. Toxicity Equivalence Factors (TEF) for dioxin and related compounds. In Part II: Health assessment for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and related compounds, Exposure and human health reassessment of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and related compounds. NCEA-I-0836. May 2000. (200 Kbytes, Adobe Acrobat PDF)"

It can only be assumed that the document may be cited and quoted but not as yet representing official EPA policy.

transport of different congeners must be taken into consideration and TEQ must be calculated at the point of exposure if more accurate assessments are to be achieved. *Similarly, many dioxin releases are associated with the release of non-dioxin-like compounds such as pesticides, metals, and non-dioxin-like PHAHs, and their risk potential may also need to be assessed in addition to dioxin-related risk.*

There are instances where exposures to PCBs are the major problem. The TEF methodology provides risk assessors with a useful tool to estimate potential dioxin-related health risks associated with these exposures. Typically, the congener makeup of environmental exposures to PCBs does not resemble the congener profile of any of the commercial mixtures produced. Because the environmental mixtures do not resemble the commercial mixtures, it is not clear that using total PCB concentrations and comparing them to any of the commercial mixtures provides an accurate assessment of the potential risks. However, the use of the TEF methodology allows for the estimation of the risk associated with the dioxin-like effects of the mixture and may provide a more accurate assessment of the risk in conjunction with the use of total PCBs. The Agency has recently published an application of this approach to the evaluation of PCB carcinogenicity (U.S. EPA, 1996; Cogliano, 1998) (footnotes in the original and emphasis added)."[24]

This description of the application of TEFs to risk assessment is identical to the example calculations presented in Tables 1 through 3 above. To the extent that Ecology's approach diverges from EPA's, it can only be assumed that Ecology does not fully understand the EPA approach or it proposes to apply the TEF methodology differently from how EPA applies it.

Cal-EPA's RPF methodology for polycyclic aromatic hydrocarbons

The MTCA rule cites the California Environmental Protection Agency (Cal-EPA) PAH methodology in support of its rulemaking changes.[25] This methodology, like that of EPA's dioxin/PCB TEF approach, is a means of assigning a relative toxicity value to a number of chemically similar individual compounds. If Ecology perceives this reference to support its view regarding the generalized approach to multi-pathway risk assessment as described in WAC 173-340-708 it is mistaken.

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[24] *EPA Dioxin Reassessment - 2000*, Chapter 9.6 at 9-33. 18 September, 2000.

[25] *Benzo[a]Pyrene as a Toxic Air Contaminant, Part B –Health Assessment, Health Effects of Benzo[a]Pyrene* . California Environmental Protection Agency, Air Resources Board. Prepared by the Air Toxicology and Epidemiology Section, Office of Environmental Health Hazard-Assessment. July 1994 (Hereinafter *Cal-EPA B[a]P Assessment.*)

The work undertaken by Cal-EPA with respect to benzo[a]pyrene (B[a]P) is an inhalation risk assessment using a potency equivalency factor (PEF) methodology. For purposes here, the PEF approach mirrors that of the TEF approach. The difference is that the individual PAH compounds are assigned a toxicity value by a PEF relative to that of benzo[a]pyrene, not 2,3,7,8-TCDD.

The exposure assessment portion of an inhalation risk assessment is significantly less complex than that of a multi-pathway risk assessment. Unlike the example fish ingestion calculations presented above, calculating inhalation risks from individual compounds of a chemical group under MTCA standard Methods B or C is relatively straightforward. Perhaps because of the superficial similarity between the structure of the calculation for standard Method B/C inhalation risk and Ecology's particular view of how individual compounds should be combined to "... evaluate the toxicity and assess the risks of [] mixtures...," Ecology has confused the two.

Cleanup standards to protect air quality are provided in WAC 173-340-750. The three MTCA Methods are used. Standard Methods B and C use equation 750-2.[26] The Method B/C individual compound equation for the cleanup level in air (CL_{air}) is:

$$CL_{air} = \frac{(RISK \times ABW \times AT \times UCF)}{(CPF \times BR \times ABS \times ED \times EF)}$$

Where:
$RISK$ = Acceptable cancer risk level (1 in 1,000,000 for Method B, 1 in 100,000 for Method C) (unitless)
ABW = Average body weight over the exposure duration (70 kg)
AT = Averaging time (75 years)
UCF = Unit conversion factor (1,000 ug/mg)
CPF = Carcinogenic potency factor as specified in WAC 173-340-708(8) (kg-day/mg)
BR = Breathing rate (20 m3/day)
ABS = Inhalation absorption fraction (1.0) (unitless)
ED = Exposure duration (30 years)
EF = Exposure frequency (1.0) (unitless)

The fixed value nature of the equation's input parameters is evident in the list of variables. For standard Methods B and C, only the CPF value is required to calculate a risk-based concentration of a compound in air.

[26] WAC 173-340-750(3)(b)(ii)(B).

In the case of benzo[a]pyrene the CPF value is 7.3 E+00 per (mg/kg)/day.[27] Solving for CL_{air} gives:

$$1.2E\text{-}03\mu g/m^3{}_{\text{B[a]P TEQ*}} = \frac{(1E-06\times 70kg\times 75yrs\times 1000)}{(7.3E+00\times 20l/d\times 1.0\times 30yrs\times 1.0)}$$

* TEQ is the result obtained from applying TEFs to individual compounds in a group. Here B[a]P's TEF is by definition 1.0.

This is nominally the same value as the Unit Risk value of $1.1E\text{-}03\mu g/m^3$ contained in the Cal-EPA B[a]P Assessment.[28]

It is not believed necessary to recreate a detailed example calculation for inhalation risk like that of the fish ingestion risk. The key difference is the direct nature of the exposure that creates the risk.

Whereas the fish-related risk estimates were derived from individual compound concentrations moving through environmental compartments (referred to as "fate and transport") to reach the individual, inhalation risks under MTCA standard Methods B/C are direct exposure issues.

The only inhalation-risk parameter that may be varied in the modified Methods B/C (ABS, the inhalation absorption fraction) is held fixed (at 100%) for all compounds in the standard approach. The effect of fixing the ABS is that there is no difference in the results whether the TEFs are applied to the air concentrations of individual compounds or if the TEFs are applied to the CFS of the individual compounds.

This unique circumstance of the exposure is still not adequate to justify Ecology's otherwise incorrect approach. Risk assessments conducted under MTCA modified Methods B/C are permitted to use modified inhalation absorption fractions.[29] This modification would be important to a credible risk assessment effort. As Ecology's Cal-EPA B[a]P reference notes, "[d]ata from rats indicate that only a fraction of the BaP inhaled is deposited on respiratory membranes. Of that which is deposited essentially all is absorbed."[30] Compare this with the MTCA standard Method B/C assumption that all inhaled B[a]P is absorbed.

The Cal-EPA B[a]P TEF approach is no different in a risk assessment context than EPA's dioxin and furan TEF approach. Regardless of any calculation-based

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[27] Integrated Risk Information System (IRIS). Benzo [a] pyrene (BaP) (CASRN 50-32-8). http://www.epa.gov/iris/subst/0136.htm [Last accessed 4 August 2006.] See also *Cal-EPA B[a]P Assessment.*

[28] The slight difference in results is due to the MTCA averaging time (AT) of 75 years versus the EPA's and Cal-EPA's 70 year AT.

[29] WAC 173-340-750(3)(c)(i).

[30] *Cal-EPA B[a]P Assessment* at 3.1.

coincidence in assessing inhalation risks, Ecology's approach to TEF use whether represented as a MTCA requirement or as CLARC guidance remains invalid.

b. Cleanup Levels and Risk Calculation (CLARC) guidance published in 2001

Ecology states the following in its *Background Document*:

"The CLARC guidance document mirrors the MTCA rule in that it describes two procedures for [sic] *identifies two methods for establishing cleanup levels for either of these two types of mixtures:*

- *Method Number 1: Default approach. With this method, the entire mixture is assumed to be as toxic (equipotent) as the index chemical for the mixture. The toxicity of mixtures of dioxins and furans and [sic] are assumed to be equipotent to the index chemical, TCDD. The toxicity of mixtures of PAHs are assumed to be equipotent to the index chemical B(a)P. The medium-specific Method B/C cleanup levels for TCDD and B(a)P are used as the cleanup levels for their respective mixtures.*

- *Method Number 2: The toxicity equivalency factor (TEF) methodology. The toxicity equivalency methodology is applied to the complex environmental mixtures of dioxins and furans, and PAHs. The total equivalency (TEQ) or total toxicity equivalent concentration (TTEC) of a mixture is the sum of the products of the concentration of each congener in the contaminated medium and its TEF (See Figure 1)."*[31]

CLARC Method Number 2 does not represent the requirements of MTCA. The prior section lays out in detail the two TEF methods cited in WAC 173-340-708. The requirements of these TEF methods clearly do not support Ecology's claim that MTCA TEF methods are mirrored in CLARC as described above. Given this, it begs the question of what CLARC does require and what methods are used.

The CLARC guidance is currently only partly available on the World Wide Web through Ecology's Toxic Cleanup Tools and Resources page.[32] Accessing CLARC in this manner brings up the screen shown in Figure 1.

[31] *Background Document* at 11.
[32] http://www.ecy.wa.gov/programs/tcp/tools/toolmain.html [last accessed 5 August 2006]

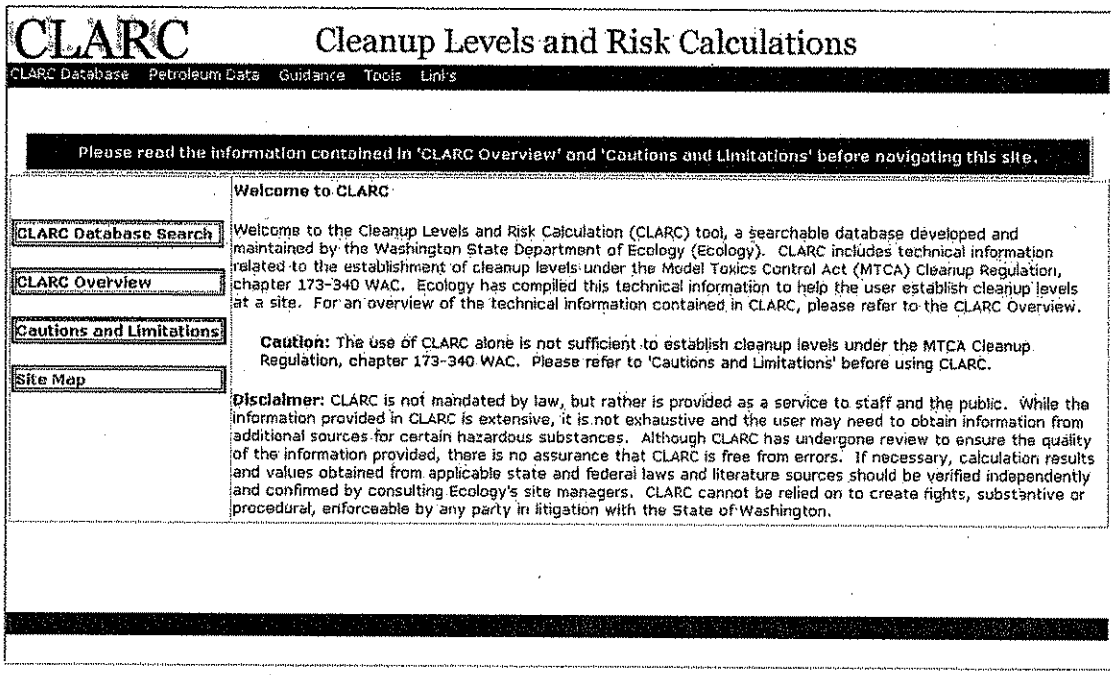


Figure 1. CLARC Introduction Screenshot found at "https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx"

It is obvious from the disclaimer that CLARC does not constitute an enforceable set of requirements. Regardless of CLARC's inapplicability to any aspect of Ecology's proposed rulemaking it is worthwhile looking at some of Ecology's claims with respect to this guidance tool.

The structure of CLARC does include options that purport to calculate cleanup levels under the three MTCA Methods A, B and C. To access these options the user clicks on the "CLARC Database Search" on the CLARC Introduction page. The following screen appears.

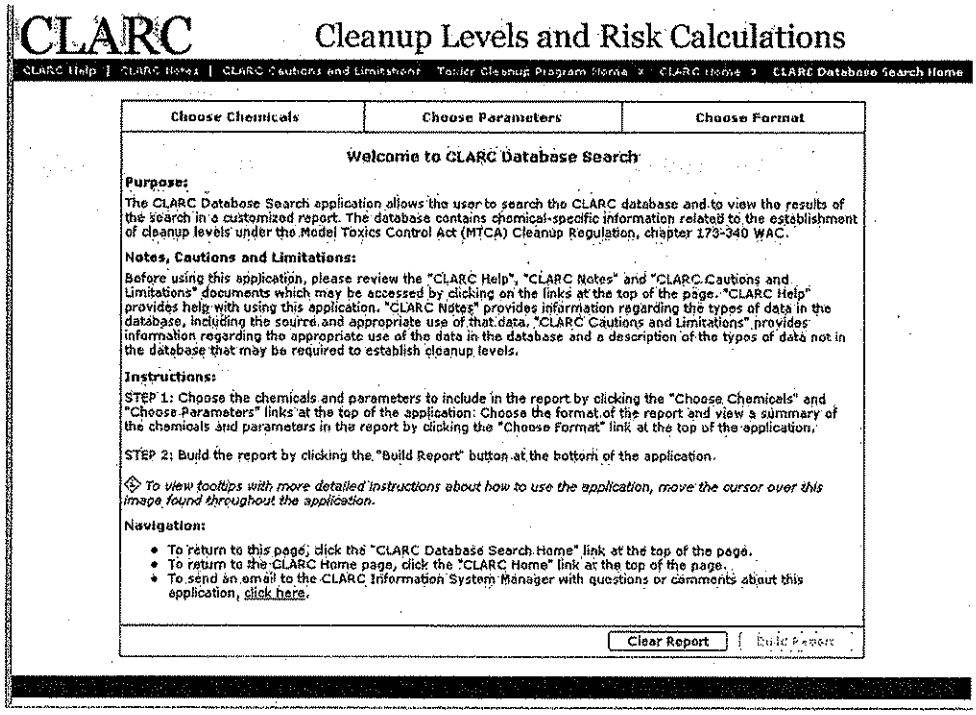


Figure 2. CLARC Database Search Screenshot found at "https://fortress.wa.gov/ecy/clarc/Reporting/CLARCReporting.aspx"

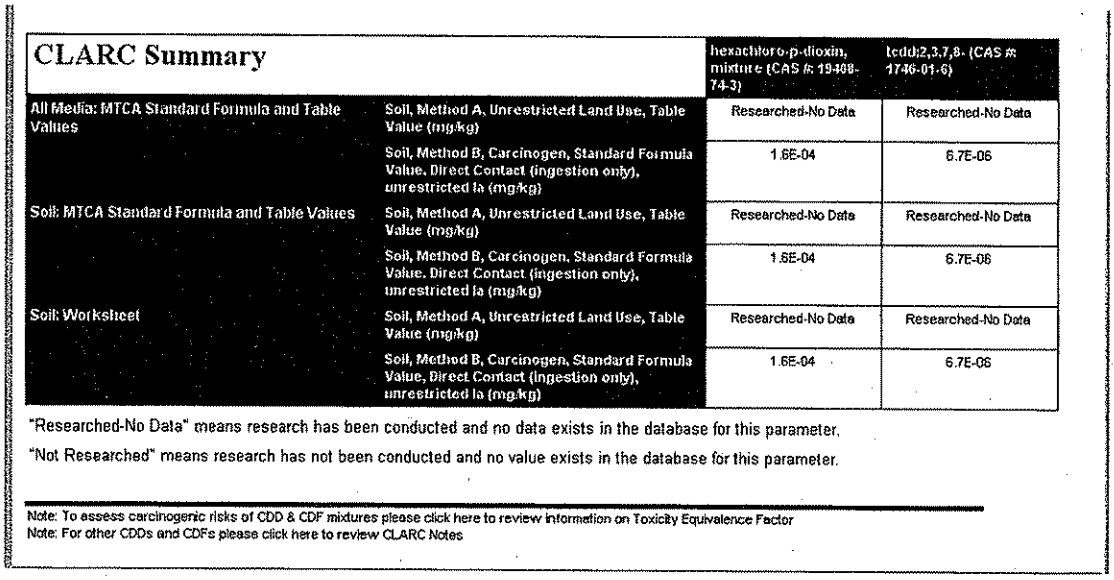
At this point the user may select compounds of interest and relevant parameters to build a report "related to the establishment of cleanup levels under the Model Toxics Control Act (MTCA) Cleanup Regulation, chapter 173-340 WAC."[33]

In its *Background Document*, Ecology focuses the attention of the reader on MTCA cleanup standards, TEF methods and its CLARC guidance. Because Ecology sees these as important background information issues, they are examined here in the context of CLARC. Several CLARC searches were conducted for the purpose of discerning how and to what extent the tool "mirrors" MTCA requirements. The examples below discuss the results.

CLARC Methods A and B for Dioxins in soil

Figure 3 shows a CLARC report for the two dioxins contained in its chemical database. The report gives results for Method A Table values and Method B, unrestricted land use for soil ingestion.

[33] This is the stated purpose of the CLARC Database Search tool. https://fortress.wa.gov/ecy/clarc/Reporting/CLARCReporting.aspx [last accessed 5 August 2006]



CLARC Summary		hexachloro-p-dioxin, mixture (CAS #: 19408-74-3)	tcdd,2,3,7,8- (CAS #: 1746-01-6)
All Media: MTCA Standard Formula and Table Values	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	Researched-No Data
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	1.6E-04	6.7E-06
Soil: MTCA Standard Formula and Table Values	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	Researched-No Data
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	1.6E-04	6.7E-06
Soil: Worksheet	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	Researched-No Data
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	1.6E-04	6.7E-06

"Researched-No Data" means research has been conducted and no data exists in the database for this parameter.

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

Note: To assess carcinogenic risks of CDD & CDF mixtures please click here to review information on Toxicity Equivalence Factor
Note: For other CDDs and CDFs please click here to review CLARC Notes

Figure 3. CLARC Database Search Screenshot for Dioxin Compounds Methods A Table and Method B, Unrestricted Land Use Soil Ingestion

It appears that dioxin mixtures cannot be evaluated with CLARC for a Method-A cleanup. Method B however does return results under the query performed.

Two dioxin mixtures are present in the CLARC database. One is a hexachloro congener mix and the other appears to be the TCDD TEQ summation of all the dioxin and furan congeners. At least in this instance CLARC does calculate specific congener values for dioxins. In doing so, it contradicts directly Ecology's characterization of the CLARC "Method Number 2" described in the background information section of the Background Document where all congeners are converted to TCDD TEQ concentrations.[34]

Also evident in comparing the "Method Number 2" results for a Method B cleanup in soils is an incorrect TEF conversion value for the hexachloro congener mix. Table 1 of Ecology's *Background Document* states the current MTCA rules uses the EPA's 1989 TEF values. Were this the case in the CLARC calculations, the soil concentration of the hexachloro congener mix would be 6.7E-05 mg/kg. The TCDD TEQ value should be ten times lower than the hexachloro mix value because all the hexachloro TEFs are 0.1.

The CLARC tool underestimates soil ingestion risk for the hexachloro congener mix. It appears by analyzing the ratio of results that CLARC continues to

[34] *Background Document* at 11.

utilize the outdated 1987 TEFs.[35] Here the comments about what CLARC is actually doing in building its reports are qualified for a reason.

The two notes shown at the bottom of the CLARC report invite the user to follow links to the CLARC guidance that explain or otherwise document the approach used in the report. Inexplicably and very inconveniently for those attempting to use and verify the results of the CLARC tool these links have been disabled.

CLARC Methods A and B for PCBs in soil

The clarity and accuracy of CLARC does not improve when using it to evaluate cleanup levels for PCBs. Figure 4 presents the CLARC report for a PCB query similar to the dioxin one above.

The Method A soil cleanup level shown is an ARAR-based value.[36] The value of 1.0 mg/kg is borrowed from federal regulation concerning PCB remediation waste storage and disposal.[37]

CLARC Summary		aroclor 1016 (CAS #: 12674-11-2)	aroclor 1254 (CAS #: 11097-69-1)	aroclor 1260 (CAS #: 11096-82-5)	polychlorinated biphenyls (CAS #: 1336-36-3)
All Media: MTCA Standard Formula and Table Values	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	Researched-No Data	Not Researched	1E+00
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	Not Researched	Not Researched	Not Researched	5E-01
Soil: MTCA Standard Formula and Table Values	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	Researched-No Data	Not Researched	1E+00
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	Not Researched	Not Researched	Not Researched	5E-01
Soil: Worksheet	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	Researched-No Data	Not Researched	1E+00
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	Not Researched	Not Researched	Not Researched	5E-01

"Researched-No Data" means research has been conducted and no data exists in the database for this parameter.

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

Note: For other pcb's in this chemical category refer to the CLARC Notes accessed through the CLARC Database portal

Figure 4. CLARC Database Search Screenshot for PCB Compounds Methods A Table and Method B, Unrestricted Land Use Soil Ingestion

It is curious that the Method A cleanup level for PCBs is twice that of the Method B level. Both methods are for PCBs in soil for unrestricted land use activities. It seems inconsistent that a Method A cleanup value would allow twice as much risk from PCBs as the Method B cleanup level. When one compares the same

[35] See Table 1 of the *Background Document* at 17.

[36] Meeting applicable, relevant and appropriate requirements (ARARs) is a cleanup level requirement under MTCA. See WAC 173-340-700(6)(a) and WAC 173-340-710.

[37] 40 C.F.R. 761.61(a)(4)(i)(A). "*High occupancy areas*. The cleanup level for bulk PCB remediation waste in high occupancy areas is ≤1 ppm without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations >1 ppm and ≤10 ppm shall be covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section."

report results for B[a]P (*see* below), it is clear that the CLARC guidance it unacceptably inconsistent.

Like the dioxin CLARC report, trying to follow the CLARC guidance note link that is provided at the bottom of the report also leads to a missing page at Ecology's web site.

CLARC Methods A, B and C for PAHs in soil

Figure 5 shows a CLARC report for Method A and B PAHs in soils.[38] The results directly contradict Ecology's certain claims that the Cal-EPA factors are used for PAH compounds.

First, it is obvious that the seven cPAH compounds listed in the MTCA rule are assessed individually.[39] Where CLARC does not provide information on individual dioxin congeners, cPAH compounds are treated separately.

Second and equally obvious is that CLARC does not apply any of the Cal-EPA factors to the individual cPAH compounds. The CLARC tool shows a cleanup level of 1.4E-01 mg/kg for both benzo[a]pyrene and chrysene. The Cal-EPA chrysene-specific factor is 0.01. According to CLARC, two individual cPAH compounds that differ 100-fold in their respective toxicity require the same cleanup level.

CLARC Summary		benzo[a]anthracene (CAS # 56-55-3)	benzo[a]pyrene (CAS # 50-32-8)
All Media: MTCA Standard Formula and Table Values	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	1E-01
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	1.4E-01	1.4E-01
Soil: MTCA Standard Formula and Table Values	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	1E-01
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	1.4E-01	1.4E-01
Soil: Worksheet	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Researched-No Data	1E-01
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted la (mg/kg)	1.4E-01	1.4E-01

"Researched-No Data" means research has been conducted and no data exists in the database for this parameter.

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

Note: To assess carcinogenic risks of c-PAH mixtures please click here to review information on Toxicity Equivalence Factor

[38] The CLARC screenshot has been cropped and stacked in two panels to fit the page legibly.

[39] WAC 173-340-200. ""PAHs (carcinogenic)" or "cPAHs" means those polycyclic aromatic hydrocarbons substances, PAHs, identified as A (known human) or B (probable human) carcinogens by the United States Environmental Protection Agency. These include benzo(a)anthracene [sic], benzo(b)fluoranthene, benzo-(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene."

benzo[b]fluoranthene (CAS # 205-99-2)	benzo[k]fluoranthene (CAS # 207-08-9)	chrysene (CAS # 218-01-9)	dibenzo[a,h]anthracene (CAS # 53-70-3)	indeno[1,2,3-cd]pyrene (CAS # 193-39-5)
Researched-No Data	Researched-No Data	Researched-No Data	Researched-No Data	Researched-No Data
1.4E-01	1.4E-01	1.4E-01	1.4E-01	1.4E-01
Researched-No Data	Researched-No Data	Researched-No Data	Researched-No Data	Researched-No Data
1.4E-01	1.4E-01	1.4E-01	1.4E-01	1.4E-01
Researched-No Data	Researched-No Data	Researched-No Data	Researched-No Data	Researched-No Data
1.4E-01	1.4E-01	1.4E-01	1.4E-01	1.4E-01

Figure 5. CLARC Database Search Screenshot for PAH Compounds Methods A Table and Method B, Unrestricted Land Use Soil Ingestion

Again, the link to additional guidance information does not work.

Ecology's CLARC tool and guidance is inconsistent and at times, inaccurate. Using Ecology's CLARC tool and guidance for evaluating cleanup levels will not return results that mirror the requirements of the MTCA rule.

i. Rayonier's legal challenge to Ecology's attempt to enforce use of CLARC guidance that conflicts with the MTCA rule

Rayonier filed an action against Ecology because the MTCA rule plainly states:

> *"For individual carcinogens, both standard and modified Method B cleanup levels are based upon the upper bound of the estimated excess lifetime cancer risk of one in one million (1 x 10-6).*
>
> *For individual noncarcinogenic substances, both standard and modified Method B cleanup levels are set at concentrations which are anticipated to result in no acute or chronic toxic effects on human health (that is, hazard quotient of one (1) or less) and no significant adverse effects on the propagation of aquatic and terrestrial organisms.*
>
> *Where a hazardous waste site involves multiple hazardous substances and/or multiple pathways of exposure, then standard and modified Method B cleanup levels for individual substances must be adjusted downward for additive health effects in accordance with the*

procedures in WAC 173-340-708 if the total excess lifetime cancer risk for a site exceeds one in one hundred thousand (1 x 10-5) or the hazard index for substances with similar noncarcinogenic toxic effects exceeds one (1)."[40]

Ecology is attempting to use the TEF methodology to justify its approach to regulate dioxins and furans (as well as numerous other compounds) at a lower risk level than other hazardous substances by classifying the 17 dioxin and furan congeners as a single hazardous substance. This is not the case and no amount of discussion about TEFs will change the fact that a dioxin TEQ is the sum of several individual hazardous substances and that these individual chemicals are in fact unique, have different TEFs, and move through environmental media differently. The selection of an appropriate TEF methodology for the various compound groups is a relative non-issue. The selection and correct use of TEF methodologies is properly left to competent research entities and is legitimized by the consensus that develops around credible science. The TEF issue as presented by Ecology is disproportionate, resulting in other issues of import being ignored or overshadowed. The reason Ecology is pursuing this rule change is exactly what it wanted when it tried and failed to force Rayonier into accepting Ecology's approach to combining numerous individual compounds into a single one that would be regulated under MTCA at a 1E-06 cleanup level.

c. Ecology's description of the proposed draft rule revisions

Section 3 of Ecology's *Background Document* summarizes its proposed rule revisions as they pertain to four issues. The issues are 1) CDD/CDFs, 2) cPAHs, 3) PCBs, and 4) "General Provisions". It is not necessary here to address each bullet presented in these four issue areas. It is worthwhile however to respond to the first bullet in the "General Provision" section.

Ecology proposes to add language to WAC 173-340-708(8) requiring "... that, when using TEFs, carcinogenic PAH-specific properties and dioxin/furan/PCB congener-specific properties be used when using modeling to predict cross-media impacts."[41] Adding this level of detail to the regulations highlights two problems.

First and as provided in the prior BSAF example, these compound-specific properties are already in use for conducting credible risk assessments. The MTCA rule provides for their use and in WAC 173-340-702(16) expressly controls the scientific credibility of their use. The section states:

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[40] WAC 173-340-700(5)(b).
[41] *Background Document* at 14.

(16) Criteria for quality of information.

(a) The intent of this subsection is to establish minimum criteria to be considered when evaluating information used by or submitted to the department proposing to modify the default methods or assumptions specified in this chapter or proposing methods or assumptions not specified in this chapter for calculating cleanup levels and remediation levels. This subsection does not establish a burden of proof or alter the burden of proof provided for elsewhere in this chapter.

(b) When deciding whether to approve or require modifications to the default methods or assumptions specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or assumptions, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted:

(i) Whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community;

(ii) Whether the information was derived using standard testing methods or other widely accepted scientific methods;

(iii) Whether a review of relevant available information, both in support of and not in support of the proposed modification, has been provided along with the rationale explaining the reasons for the proposed modification;

(iv) Whether the assumptions used in applying the information to the facility are valid and would ensure the proposed modification would err on behalf of protection of human health and the environment;

The MTCA rule therefore already contains criteria for evaluating compound-specific information. We believe that the proposed rule changes do not clarify the rule, but rather attempt to formalize contradiction and inappropriate scientific methodology within MTCA.

d. Rayonier input on Ecology's listed rulemaking issues

Ecology presents its proposed rulemaking issues in section 4 of the *Background Document*. Figure 2 of that document summarizes the nine key issues. In the interest of avoiding redundancy in responding to the problems Rayonier has identified with these rulemaking issues, the following discussion will briefly comment on each of nine points as Ecology presents them.

Key Rulemaking Issues

Dioxin/Furan Mixtures

Issue No. 1

When characterizing the carcinogenic risks of dioxin/furan mixtures, should Ecology use the EPA-89 TEF values or the WHO-98 TEF values?

Response No. 1

Rayonier supports the use of TEF values recognized by the EPA. Currently EPA is reviewing the WHO_{98} TEFs. The EPA describes its position on dioxin TEFs as follows:

> *"Since the 1970's, different sets of TEFs have been developed and used for evaluating mixtures of dioxin compounds. Because a uniform set of TEFs does not exist and because dioxin is currently under reassessment by EPA, two sets of TEFs are discussed here. They are the International set and the World Health Organization (WHO) set.*
>
> *The International approach was initially adopted by EPA in 1989 (U.S. Environmental Protection Agency, 1989). This procedure assigns TEFs for a total of 17 compounds. The current written EPA policy adopts this approach. Another notable approach for TEFs was established by WHO (Van den Berg et al, 1998). This approach also includes a total of 17 compounds. The WHO approach for developing TEF values differs from the International approach for 3 compounds, 2 of which would not alone significantly change any TCDD TEQ value. However, for one compound (a penta form of the dioxin) the TEF for the WHO 1998 approach is twice as high (1 vs. 0.5) as that of the International approach. EPA is currently in the process of formally evaluating the WHO approach as a part of the Dioxin Reassessment."*[42]

[42] *Dioxin in Air*. EPA Fact Sheet available at http://www.epa.gov/wtc/dioxin/dioxin_fact_sheet.html [last accessed 6 August 2006]. See also the two references cited in the fact sheet. They are:

Issue No. 2

Should dioxin/furan mixtures be treated as a single hazardous substance or a mixture of multiple hazardous substances when calculating excess cancer risks and determining compliance with cleanup and remediation levels under MTCA?

Response No. 2

Rayonier believes there is no scientifically justified reason for classifying mixtures of individual compounds as a single hazardous substance. Doing so results in technically corrupt assessment procedures and indefensible risk estimates. Rayonier does support the proper use of EPA-approved TEF methodologies in assigning toxicity values to individual compounds within a chemical group.

As a policy matter, Rayonier strongly objects to Ecology's attempt by this proposed change to rewrite the acceptable risk levels for individual compounds established in MTCA. Ecology is lowering the acceptable risk level for numerous compounds it believes should be regulated below the MTCA individual carcinogen acceptable risk level of 1×10^{-6}.

PAH Mixtures

Issue No. 3

When characterizing the carcinogenic risks of PAH mixtures, should Ecology use the RPF/TEF values in the 2005 California EPA Guidance Document?

Response No. 3

Previously discussed.

Issue No. 4

When characterizing the carcinogenic risks of PAH mixtures, should Ecology continue to focus its' evaluation on the seven PAH compounds identified in the current MTCA rule?

U.S. Environmental Protection Agency (1989). Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and dibenzofurans (CDDs and CDFs) and 1989 update. Washington, DC: Risk Assessment Forum. EPA/625/3-89/016) and,

Van den Berg et al. 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. Environmental Health Perspectives 106 (12)

Response No. 4

Rayonier believes Ecology should focus on the individual compounds that present a potential risk to human health and the environment. Which compounds these are will vary from site to site and within media-specific environmental compartments.

The MTCA rule should capture the proper treatment of cPAH compounds. That proper treatment is the evaluation of the risk posed by the individual compounds.

Issue No. 5

Should PAH mixtures be treated as a single hazardous substance or a mixture of multiple hazardous substances when calculating excess cancer risks and determining compliance with cleanup and remediation levels under MTCA?

Response No. 5

Rayonier believes there is no scientifically justified reason for classifying mixtures of individual compounds as a single hazardous substance. Doing so can result in technically corrupt assessment procedures and indefensible risk estimates. Rayonier does support the proper use of EPA-approved TEF methodologies in assigning toxicity values to individual compounds within a chemical group.

As a policy matter, Rayonier strongly objects to this Ecology attempt to rewrite the acceptable risk levels for individual compounds established in MTCA. Ecology is lowering the acceptable risk level for numerous compounds it believes should be regulated below the MTCA individual carcinogen acceptable risk level of 1 X 10^{-6}.

PCB Mixtures

Issue No. 6

Should Ecology amend the MTCA rule to explicitly allow or require the use of the WHO-1998 TEF values and methodology to assess the carcinogenic risks of PCB mixtures?

Response No. 6

The selection and correct use of TEF methodologies is properly left to competent research entities and is legitimized by the consensus that develops around credible science. The rule should reflect the current policy and guidance set forth by EPA.

Issue No. 7

Should PCB mixtures be treated as a single hazardous substance or a mixture of multiple hazardous substances when calculating excess cancer risks and determining compliance with cleanup and remediation levels under MTCA?

Response No. 7

Rayonier believes there is no scientifically justified reason for classifying mixtures of individual compounds as a single hazardous substance. Doing so results in technically corrupt assessment procedures and indefensible risk estimates. Rayonier does support the proper use of EPA-approved TEF methodologies.

As a policy matter, Rayonier strongly objects to Ecology's attempt by this proposed change to rewrite the acceptable risk levels for individual compounds established in MTCA. Ecology is lowering the acceptable risk level for numerous compounds it believes should be regulated below the MTCA individual carcinogen acceptable risk level of 1×10^{-6}.

Issue No. 8

How should Ecology take into account non-dioxin-like health effects when using the TEF methodology to assess PCB mixtures?

Response No. 8

Again, EPA has identified an appropriate approach built around a process of scientific peer- review and discussion for evaluating health effects. Ecology should follow the guidance provided by EPA.

General Issues

Issue No. 9

How should Ecology apply the TEF methodology when evaluating cross-media impacts?

Response No. 9

Rayonier believes that Ecology should apply TEF methodologies as they are designed to be used by the science supporting them. The various TEF methodologies being considered in this rulemaking are tools to assign a relative toxicity value to an individual compound within a group of similar compounds. The point at which the TEF value is applied should be left to proper and accepted risk assessment procedures.

VII. Conclusion

Ecology has not demonstrated the need for this proposed rule, the rulemaking would arbitrarily regulate mixtures of dioxins/furans, PAHs and PCBs differently and more stringently than other mixtures, Ecology has not provided any evaluation of its practical impacts and implementation problems and costs, and the proposed application of the TEF methodology and the CLARC guidance under the rulemaking is scientifically and technically unsound. These are fundamental flaws that indicate this proposal should not advance to any proposed or final rule.